UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/196,013	11/19/1998	NORIO KOMA	5586D-7076	8659

26021 7590 09/20/2004

HOGAN & HARTSON L.L.P.
500 S. GRAND AVENUE
SUITE 1900
LOS ANGELES, CA 90071-2611

EXAMINER	
PRIZIO JR, PETER	

ART UNIT	PAPER NUMBER
2674	33

DATE MAILED: 09/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/196,013	KOMA, NORIO	
	Examiner	Art Unit	
	Peter Prizio	2674	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 May 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-5 and 7-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-5 and 7-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Response to Amendment

2. This action is in response to the amendment dated 19 May 2004.

Claim Status

3. Claims 1, 3 – 5, and 7 – 30 pending.

4. Claims 1, 3 – 5, and 7 – 30 rejected.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. **Claims 1, 5, 9 – 15, 18 – 28, and 30** are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 5,920,301 to Sakamoto et al. (Sakamoto) in view of US Patent 4,942,458 to Miyajima et al. (Miyajima).

7. Regarding claim 1, Sakamoto (Figs. 5B, 7 &12) teaches a liquid crystal display (column 1, lines 16 – 20) having liquid crystal sandwiched between a pair of substrates having electrodes (column 5, lines 40 – 47) for driving the liquid crystal based on

respective R, G, and B signals (signals R, G, and B as illustrated as inputs to memory 57) to control transmittance of each of the R, G, and B light components for color display, wherein each of the upper limit values of ranges for driving voltages (+VD as illustrated) respectively for R display, G display, and B display is set independently (since each RGB signal is input into the memory and carried through the rest of the circuit to the gate driver) for R light, G light, and B light without control voltage applied to the substrates to control the intensity of R, G, and B light, an upper limit value for a range of values useable within an entire duration of display as driving voltages for respective R, G, and B light components (Vsat as illustrated), but Sakamoto fails to teach an upper limit value for at least one of the colors differs from the upper limit values for the other colors and controlling the intensity of the R, G, and B light simultaneously.

8. However, Miyajima (Figs. 6 & 7a-c) teaches a voltage characteristic where the upper limit for at least one of the colors differs from the upper limit values for the other colors (any transmittance point on the transmittance vs. Vrms curve will result in two voltages i.e. V2 and Von. Further the curve R reaches maximum transmittance at a lower voltage than the GB curves and therefore the upper limit value is different). Miyajima also teaches simultaneously controlling the intensity of the R, G, and B light (figs. 7a-c where each pulse occurs at the same time).

9. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the display as taught by Sakamoto by utilizing the driving scheme comprising different upper limit values while simultaneously controlling

the intensity of the R, G, and B as taught by Miyajima for the benefit of substantially equalizing the transmittances independently resulting in excellent color balances (pertinent sections of the reference include column 3, lines 9 – 45; column 5, line65 – column 6, line 30, and column 7, lines 3 – 30).

10. Claim 5 shares similar limitations as to those set forth in claim 1 and therefore the rationale of rejection will be the same.

11. Regarding claim 9, Sakamoto in view of Miyajima, as applied to claim 1 above, further teaches each of said upper limit values of ranges for the driving voltages applied to the liquid crystal is set based on the transmittance characteristic of each of R, G, and B light components (Miyajima, column 6, lines 1 – 19, where "a transmittance can be changed...for each R, G, and B pixels" and further in column 5, lines 10 – 16 where by changing the resistors, the reference potentials are determined that set the transmittances).

12. Claim 10 shares similar limitations as to those set forth in claim 1 and therefore the rationale of rejection will be the same. Claim 10 differs from claim 1 with regards to the added feature of "the maximum difference among the set voltages stays within 20%" (Miyajima, column 6, lines 25 – 31, where the voltage VON and V2 are not different by more than 20% if the maximum voltage is at a line not shown where the GB line is at 100% transmittance and the minimum voltage is VOFF located at T1)

13. Claim 11 shares similar limitations as to those set forth in claim 1 and therefore the rationale of rejection will be the same. Claim 11 differs from claim 1 with regards to the added feature of "which shows non-transmittance to the light when no voltage is

applied," (Miyajima teaches, column 2, lines 27+ where a state wherein no light is transmitted is a reference and from the equation in column 2, VOFF can be minimized when N is 1).

14. Claim 12, dependent on claim 11, shares similar limitations to those included in claim 10 and therefore the rationale of rejection will be the same.

15. Claim 13 shares similar limitations as to those set forth in claim 1 and therefore the rationale of rejection will be the same. Claim 13 differs from claim 1 with regards to the added feature of a "pixel and opposing electrode" (Sakamoto further teaches a pixel electrode and opposing electrode, column 3, lines 42 – 44).

16. Claim 14, dependent on claim 13, shares similar limitations to those included in claim 10 and therefore the rationale of rejection will be the same.

17. Regarding claim 15, Miyajima, as applied to claim 13 above, further teaches the maximum light transmittance is defined by the upper limit values of ranges of the driving voltages (as shown in figure 6, the maximum transmittance for the R curve is defined by a lower voltage than the maximum transmittance of the GB curve where the transmittance is dependent on the upper limits column 5, lines 8 – 16)

18. Claim 18 shares similar limitations as to those set forth in claim 13 and therefore the rational of rejection will be the same.

19. Regarding claim 19, Sakamoto (Fig. 16) teaches a liquid crystal display comprising: a display section ('LC Device' contained within 63) and a display section driving circuit (21 and 22) which supplies a driving voltage signal in accordance with a display content (21), but fails to teach wherein said display section driving circuit

includes a maximum transmittance voltage limiting circuit which limits throughout an entire duration of display, regardless of display content, a maximum transmittance voltage level existing for each of R, G, and B light components that achieves maximum crystal transmittance of said driving voltage signals to a voltage level determined in accordance with a transmittance characteristic of each of R, G, and B light components, and said driving voltage signal having its maximum transmittance voltage level limited by said voltage limiting circuit is supplied to a corresponding pixel in said display section.

20. However, Miyajima (Fig. 5) teaches a maximum transmittance voltage limiting circuit (the group of resistors shown in fig. 5) which limits throughout an entire duration of display, regardless of display content (regardless of the inputted voltages, the variable resistors are used to determine an appropriate reference potential and further), a maximum transmittance voltage level existing for each of R, G, and B light components that achieves maximum crystal transmittance of said driving voltage signals to a voltage level determined in accordance with a transmittance characteristic of each of R, G, and B light components (column 6, lines 1 – 19), and said driving voltage signal having its maximum transmittance voltage level limited by said voltage limiting circuit is supplied to a corresponding pixel in said display section (the transmittance will only reach as high as the voltage will allow depending on the settings of VH and VL for each color, column 6, lines 10 – 40).

21. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the display as taught by Sakamoto by utilizing the

driving scheme comprising upper limit values for the voltages which in turn will limit the maximum transmittance as taught by Miyajima for the benefit of excellent color balances and adjustment (column 7, lines 3 – 30).

22. Regarding claim 20, Miyajima, as applied to claim 19 above, further teaches the display section driving circuit includes a minimum transmittance voltage limiting circuit which limits, regardless of display content, a minimum transmittance voltage level for achieving minimum liquid crystal transmittance of said driving voltage signal (similarly to claim 19, the resistor circuit shown in figure 5 also is used to adjust VLR, VLG, and VLB and therefore limits the minimum voltages as well) to a predetermined voltage level greater than 0V by absolute value (the minimum transmittance is shown to correspond to Voff in fig. 4 which is obviously greater than 0V).

23. Regarding claim 21, Sakamoto in view of Miyajima (Fig. 6), as applied to claim 19 above, further the maximum transmittance voltage levels determined and limited for R and B light components differ from each other (as described in the rejection of claim 1, Miyajima teaches a transmittance curve where the R curve reaches maximum transmittance at a lower voltage than the GB curve and therefore at least the R and B components differ from each other).

24. Regarding claim 22, Miyajima, as applied to claim 19 above, further teaches no transmittance characteristic in a state of no voltage application (the equation shown in column 2 results in a value for VOFF being 0 when N=1 and therefore at VOFF = 0 on the graph shown in fig. 4, the transmittance will be 0%).

25. Regarding claim 23, Miyajima (Fig. 6), as applied to claim 22 above, further teaches among said driving voltage signals for respective R, G, and B lights components, said maximum transmittance voltage level for B light is limited to a voltage level smaller than said maximum transmittances voltage level for R light by absolute value (the transmittance curve where the R curve reaches maximum transmittance at a lower voltage than the GB curve, however, according to claim 10, the transmittance is at a maximum at that same point as limited by the values of the resistors as shown in fig. 5 therefore if the R curve can be limited to reach maximum at a lower voltage than the GB curve and the R and GB curves can be limited to reach a maximum at the same time, it would be obvious to one of ordinary skill in the art to limit the GB curve to reach a maximum voltage depending on the values of VHR, VHG, and VHB)

26. Regarding claim 24, Sakamoto in view of Miyajima (Fig. 6), as applied to claim 1 above, further teaches at least the upper limit values for R and B light components differ from each other (as described in the rejection of claim 1, Miyajima teaches a transmittance curve where the R curve reaches maximum transmittance at a lower voltage than the GB curve and therefore at least the R and B components differ from each other).

27. Claim 25, dependent on claim 5, shares similar limitations to those of claim 24 and therefore the rational of rejection will be the same.

28. Claim 26, dependent on claim 10, shares similar limitations to those of claim 24 and therefore the rational of rejection will be the same.

29. Claim 27, dependent on claim 11, shares similar limitations to those of claim 24 and therefore the rational of rejection will be the same.

30. Claim 28, dependent on claim 13, shares similar limitations to those of claim 24 and therefore the rational of rejection will be the same.

31. Claim 30, dependent on claim 18, shares similar limitations to those of claim 24 and therefore the rational of rejection will be the same.

32. **Claims 16, 17, and 29** are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakamoto in view of Miyajima as applied to claims 1, 5, 9 – 15, 18, 24 – 28, and 30 above, and further in view of US Patent 5,691,791 to Nakamura et al. (Nakamura).

33. Claim 16 shares similar limitations as to those set forth in claim 1 and therefore the rationale of rejection will be the same, but Sakamoto in view of Miyajima fails to teach a reflective display, reflection electrode, and transparent electrode.

34. However, Nakamura teaches a reflective liquid crystal display (abstract), a reflection electrode (column 7, lines 52 – 54), and transparent electrode (column 7, lines 62 – 65).

35. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the combined display apparatus as taught by Sakamoto in view of Miyajima to be a reflective type display comprising a reflective display, reflection electrode and transparent electrode as taught by Nakamura resulting

in a display with an improved contrast ratio and excellent "paper-white" property (column 4, lines 14 – 19).

36. Regarding claim 17, Nakamura further teaches said reflection electrode is a pixel electrode (column 7, lines 53 – 54) formed individually for each pixel (column 8, line 15), and each upper limit values of ranges for driving voltages of said R, G, and B driving signals applied to respective pixel electrode is set independently for R, G, and B light (see rejection of claim 1 above).

37. Claim 29 shares similar limitations to those of claim 24 and therefore the rational of rejection will be the same.

38. **Claims 3 and 7** are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakamoto in view of Miyajima as applied to claims 1 and 5 above, and further in view of US Patent 6,078,317 to Sawada.

39. Regarding claim 3, Sakamoto in view of Miyajima fails to teach a gamma correction. However, Sawada (Fig. 1) teaches a gamma characteristic adjustment circuit (19, column 6, lines 63 – 65). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the combination of Sakamoto in view of Miyajima with a gamma characteristic adjustment circuit as taught by Sawada for the benefit of not only controlling the transmittance resulting in proper color balance but also controlling the luminance of the display as is known when gamma correction is applied.

40. Claim 7, dependent on claim 5, shares similar limitations to those of claim 3 and therefore the rational of rejection will be the same.

41. **Claims 4 and 8** are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakamoto in view of Miyajima as applied to claims 1 and 5 above, and further in view of US Patent 5,834,827 to Miyasaka et al. (Miyasaka).

42. Regarding claim 4, Sakamoto in view of Miyajima teaches a TFT based LCD display (Sakamoto, Abstract), but fails to specify that the TFTs used are poly-Si thin film transistors using a poly-Si layer formed at low temperature. However, Miyasaka teaches using poly-Si thin film transistors using a poly-Si layer formed at low temperature (column 1, lines 51 – 65). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the combination of Sakamoto in view of Miyajima with a low temperature poly-Si TFTs as taught by Miyasaka for the benefit of high performance TFTs that can result in larger display size while decreasing cost (column 1, lines 40+ and column 14, lines 28 – 40).

43. Claim 8, dependent on claim 5, shares similar limitations to those of claim 4 and therefore the rational of rejection will be the same.

Conclusion

44. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following US Patents have been included to show display devices where the transmittance is controlled

US Patent 5,790,240 to Ishikawa et al.

US Patent 5,196,924 to Lumelsky et al.

US Patent 6,181,368 to Takahashi et al.

US Patent 4,989,954 to Yokoyama et al.

Response to Arguments

45. Applicant's arguments, see Amendment, filed 19 May 2004, with respect to the rejection(s)of claim(s) 1 under 35 USC 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Miyajima.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter Prizio whose telephone number is (703) 305-5712. The examiner can normally be reached on Monday-Friday (7:30-5:00), alternating Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Hjerpe can be reached on (703) 305-4709. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Peter Prizio
Examiner
Art Unit 2674

Prizio
September 16, 2004

HENRY N. TRAN
PRIMARY EXAMINER